Name Key Date ____________ Pd ______

Chapter 5 White Board Test Review

5.1

Simplify.

$k(k^4)$

K^{1+4}

$\boxed{K^5}$

$(4w^5v)(6w^6v^2)$

$24w^{5+6}v^{1+2}$

$\boxed{24w^{11}v^3}$

$(5a^3b^{10}c)^2$

$\boxed{25a^6b^{20}c^2}$

$(3x^3y)(3xy^2z)^4(3xyz)$

$(3x^3y)(81x^4y^8z^4)(3xyz)$

$729x^{3+4+1}y^{1+8+1}z^{4+1}$

$\boxed{729x^8y^{10}z^5}$

$(2xy^5)(-y)^4$

$(2xy^5)(y^4)$

$2xy^{5+4}$

$\boxed{2xy^9}$

Enrichment and Extension

$2^n = 4^3$

$2^n = (2^2)^3$

$2^n = 2^6$

$\boxed{n=6}$

$9^{n-1} = 9^4$

$n-\cancel{1}=4$

$\quad +1 \quad +1$

$\boxed{n=5}$

$(5^n)(5^4) = 125$

$5^{n+4} = 5^3$

$n+\cancel{4} = 3$

$\quad -4 \quad -4$

$\boxed{n=-1}$

$(2^n)^n = 4^8$

$2^{n^2} = (2^2)^8$

$2^{n^2} = 2^{16}$

$\boxed{n^2=16}$

$\boxed{n=\pm 4}$

$3^{2n} = 729$

$3^{2n} = 3^9$

$\frac{\cancel{2}n}{\cancel{2}} = \frac{9}{2}$

$\boxed{n=\frac{9}{2}}$

5.2

Simplify. *No negative exponents.*

x^{-1}

$\boxed{\frac{1}{x}}$

$3x^{-6}$

$3\left(\frac{1}{x^6}\right)$

$\boxed{\frac{3}{x^6}}$

$\frac{4}{b^{-7}}$

$\boxed{4b^7}$

$(ab^4)^1$

$\boxed{ab^4}$

$\frac{y^6}{y^4}$

y^{6-4}

$\boxed{y^2}$

$\frac{p^4}{p}$

p^{4-1}

$\boxed{p^3}$

$8^{n-2} = \sqrt{8}$

$8^{n-2} = 8^{\frac{1}{2}}$

$n-\cancel{2} = \frac{1}{2}$

$\quad +2 \quad +2$

$n = \frac{1}{2} + \frac{4}{2} = \boxed{\frac{5}{2}}$

Enrichment and Extension: Using the formula $\sqrt{a^2 \pm b} \approx a \pm \frac{b}{2a}$ *to approximate the answers to the nearest thousandth without using a calculator. Then check your answer with the calculator.*

$\sqrt{10}$

$\sqrt{9+1}$

$\approx 3+\frac{1}{2(6)}$

$\approx 3+\frac{1}{12}$

$\boxed{\approx 3.083}$

$\sqrt{104}$

$\sqrt{100+4}$

$\approx 10+\frac{4}{20}$

$\approx 10+\frac{1}{5}$

$\boxed{\approx 10.2}$

$\sqrt{83}$

$\sqrt{81+2}$

$\approx 9+\frac{2}{18}$

$\approx 9+\frac{1}{9}$

$\boxed{\approx 9.111}$

$\sqrt{141}$

$\sqrt{144-3}$

$\approx 12-\frac{3}{24}$

$\approx 12-\frac{1}{8}$

$\boxed{\approx 11.875}$

$\sqrt{13}$

$\sqrt{16-3}$

$\approx 4-\frac{3}{8}$

≈ 3.625

5.3

Describe the transformation of f(x) = x² represented by g.

$g(x) = x^2 - 9$ ↓9u

$g(x) = \frac{1}{4}x^2 + 5$ VC by $\frac{1}{4}$; ↑5u

$g(x) = \frac{1}{2}x^2$ VC@$\frac{1}{2}$

$g(x) = x^2 - \frac{1}{2}$ ↓$\frac{1}{2}$u

5.4

Determine if the given numbers could be the lengths of the sides of a right triangle. $a^2 + b^2 = c^2$

a = 9, b = 40, c = 41 ✓

$9^2 + 40^2 \_\_ 41^2$

$81 + 1600 \underline{=} 1681$

a = 18, b = 24, c = 30 ✓

$18^2 + 24^2 \_\_ 30^2$

$324 + 576 \underline{=} 900$

a= 8, b = 15, c = 17 ✓

$8^2 + 15^2 \_\_ 17^2$

$64 + 225 \underline{=} 289$

Solve the equations. Check your solution.

$(\sqrt[3]{x - 14})^3 = (-2)^3$

$x - 14 = 8$

$+14 \quad +14$

$\boxed{x \neq 22}$

$\sqrt[3]{22-14} \neq -2$

$\emptyset$

$-5\sqrt{16x} + \cancel{17} = -8$ $\boxed{\emptyset}$

$-17 \quad -17$

$\frac{\cancel{-5}\sqrt{16x}}{\cancel{-5}} = \frac{-28}{-5}$

$(\sqrt{16x})^2 = \left(\frac{28}{5}\right)^2$

$\frac{\cancel{16}x}{\cancel{16}} = \frac{784}{25} / 16$

$\boxed{x \neq \frac{49}{25}}$

$\frac{1}{4}\sqrt[3]{2x} + \cancel{8} = 6$

$-8 \quad -8$

$\cancel{4} \cdot \cancel{\frac{1}{4}}\sqrt[3]{2x} = -2 \cdot 4$

$(\sqrt[3]{2x})^3 = (-8)^3$

$\frac{\cancel{2}x}{\cancel{2}} = \frac{-512}{2}$

$\boxed{x = -256}$ ✓

$\sqrt[2]{3x} - \cancel{\frac{3}{4}} = 0$

$+\frac{3}{4} \quad +\frac{3}{4}$

$(\sqrt{3x})^2 = \left(\frac{3}{4}\right)^2$

$\frac{\cancel{3}x}{\cancel{3}} = \frac{9}{16} / 3$

$\boxed{x = \frac{3}{16}}$ ✓

Enrichment and Extension: Using the graphing calculator to solve radical equations or inequalities. Round your answer to three decimal places when necessary. (HINT: make the equation = 0 then find the zeros.)

$\sqrt{x + 25} = \cancel{2}$

$-2 \quad -\cancel{2}$

$\sqrt{x + 25} - 2 = 0$

$y_1 = \sqrt{x+25} - 2$

Zero: $(-21, 0)$

$\boxed{x = -21}$

$\cancel{\sqrt{x + 1}} = 5 - \sqrt{x + 6}$

$-\cancel{\sqrt{x+1}} \quad -\sqrt{x+1}$

$0 = 5 - \sqrt{x+6} - \sqrt{x+1}$

$y_1 = 5 - \sqrt{x+6} - \sqrt{x+1}$

Zero: $(3, 0)$

$\boxed{x = 3}$

$\cancel{\sqrt[3]{x + 5}} = 2\sqrt[3]{2x + 6}$

$-\cancel{\sqrt[3]{x+5}} \quad -\sqrt[3]{x+5}$

$0 = 2\sqrt[3]{2x+6} - \sqrt[3]{x+5}$

$y_1 = 2\sqrt[3]{2x+6} - \sqrt[3]{x+5}$

Zero: $(-2.867, 0)$

$\boxed{x = -2.867}$

5.5

Simplify.

$3x(x^3 + 2x)$

$\boxed{3x^4 + 6x^2}$

$\frac{14x}{-2x^7}$

$-7x^{1-6}$

$-7x^{-5}$

$\boxed{\frac{-7}{x^5}}$

$\frac{x^3}{x^2 - x}$

$\frac{\cancel{x}^{3\,2}}{\cancel{x}(x-1)}$

$\boxed{\frac{x^2}{x-1}}$

$(ab)^4$

$\boxed{a^4b^4}$

$(a + b)(a - 6b)$

$a^2 - 6ab + ab - 6b^2$

$\boxed{a^2 - 5ab - 6b^2}$

Perform the given operation or composition. State the domain too.

$$f(x) = \sqrt[3]{4x}, \quad g(x) = -9\sqrt[3]{4x}, \quad x = -2$$

(f + g)(x) =

$\sqrt[3]{4x} + (-9\sqrt[3]{4x})$

$\boxed{-8\sqrt[3]{4x}}$

D: $(-\infty, \infty)$

$x = -2$: $-8\sqrt[3]{4(-2)} = \boxed{16}$

(f – g)(x) =

$\sqrt[3]{4x} - (-9\sqrt[3]{4x}) = \boxed{10\sqrt[3]{4x}}$

D: $(-\infty, \infty)$

$x = -2$: $10\sqrt[3]{4(-2)} = \boxed{-20}$

$$f(x) = 3x^2, \quad g(x) = 5x^{\frac{1}{4}}, \quad x = 16$$

(fg)(x) =

$(3x^2)(5x^{\frac{1}{4}}) = 15x^{2+\frac{1}{4}} = \boxed{15x^{\frac{9}{4}}}$

D: $[0, \infty)$

$x = 16$: $15(16)^{\frac{9}{4}} = \boxed{7680}$

$\left(\frac{f}{g}\right)(x) = \frac{3x^2}{5x^{\frac{1}{4}}} = \frac{3x^{2-\frac{1}{4}}}{5} = \boxed{\frac{3x^{\frac{7}{4}}}{5}}$

D: $(0, \infty)$

$x = 16$: $\frac{3(16)^{\frac{7}{4}}}{5} = \boxed{\frac{384}{5} \approx 76.8}$

$$f(x) = 3x - 5x^2 - x^3, \quad g(x) = 6x^2 - 4x$$

f(g(x)) =

$\boxed{3(6x^2 - 4x) - 5(6x^2 - 4x)^2 - (6x^2 - 4x)^3}$

✗ just set up ✗

(g ○ f)(x) =

$\boxed{6(3x - 5x^2 - x^3)^2 - 4(3x - 5x^2 - x^3)}$

✗ just set up ✗

5.6

Solve the literal equation for y.

3x – y = 4

$-3x \quad -3x$

$-y = -3x + 4$

$\div -1$

$\boxed{y = 3x - 4}$

3x – 2y = 10

$-3x \quad -3x$

$\frac{-2y}{-2} = \frac{-3x + 10}{-2}$

$\boxed{y = \frac{3}{2}x - 5}$

5x + 6y = 9

$-5x \quad -5x$

$\frac{6y}{6} = \frac{-5x + 9}{6}$

$\boxed{y = -\frac{5}{6}x + \frac{9}{6}}$

4x + y – 6 = 1

$-4x \quad -4x$

$y - 6 = 1 - 4x$

$+6 \quad +6$

$\boxed{y = 7 - 4x}$

x – 6y = 9

$-x \quad -x$

$\frac{-6y}{-6} = \frac{-x + 9}{-6}$

$\boxed{y = \frac{1}{6}x - \frac{9}{6}}$

Find the inverse of the function.

f(x) = 4x

$\frac{x}{4} = \frac{4y}{4}$

$\boxed{\frac{1}{4}x = y^{-1}}$

f(x) = 4x – 1

$x = 4y - 1$

$+1 \quad +1$

$\frac{x + 1}{4} = \frac{4y}{4}$

$\boxed{\frac{1}{4}x + \frac{1}{4} = y^{-1}}$

f(x) = .5x – 5

$x = \frac{1}{2}y - 5$

$+5 \quad +5$

$2 \cdot x + 5 = \frac{1}{2}y \cdot 2$

$\boxed{2x + 10 = y^{-1}}$

f(x) = (1/5)x – 2

$x = \frac{1}{5}y - 2$

$+2 \quad +2$

$5 \cdot x + 2 = \frac{1}{5}y \cdot 5$

$\boxed{5x + 10 = y^{-1}}$

<u>Enrichment and Extension:</u> Find the inverse of the function by completing the square.

f(x) = x^2 – 2x

$x = y^2 - 2y$

$\boxed{1} + x = y^2 - 2y + \boxed{1}$

$\left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$

$\sqrt{1 + x} = \sqrt{(y - 1)^2}$

$\pm\sqrt{1 + x} = y - 1$

$+1 \quad +1$

$\boxed{1 \pm \sqrt{1 + x} = y^{-1}}$

f(x) = x^2 + 8x

$x = y^2 + 8y$

$x + \boxed{16} = y^2 + 8y + \boxed{16}$

$\left(\frac{8}{2}\right)^2 = (4)^2$

$\sqrt{x + 16} = \sqrt{(y + 4)^2}$

$\pm\sqrt{x + 16} = y + 4$

$-4 \quad -4$

$\boxed{-4 \pm \sqrt{x + 16} = y^{-1}}$

f(x) = x^2 – 8x + 12

$x = y^2 - 8x + 12$

$-12 \quad -12$

$x - 12 + \boxed{16} = y^2 - 8x + \boxed{16}$

$\left(-\frac{8}{2}\right)^2 = (-4)^2$

$\sqrt{x + 4} = \sqrt{(y - 4)^2}$

$\pm\sqrt{x + 4} = y - 4$

$+4 \quad +4$

$\boxed{4 \pm \sqrt{x + 4} = y^{-1}}$

f(x) = x^2 – 4x + 12

$x = y^2 - 4y + 12$

$-12 \quad -12$

$x - 12 + \boxed{4} = y^2 - 4y + \boxed{4}$

$\left(\frac{-4}{2}\right)^2 = (-2)^2 = 4$

$\sqrt{x - 8} = \sqrt{(y - 2)^2}$

$\pm\sqrt{x - 8} = y - 2$

$+2 \quad +2$

$\boxed{2 \pm \sqrt{x - 8} = y^{-1}}$